ASOS MODIFICATION NOTE 31 (for Electronics Technicians)
Engineering Division
W/OSO321:BGM/AJW

SUBJECT	:	ACU Memory Firmware Version 2.3 and ACU CPU Firmware 1.81
PURPOSE	:	To add Freezing Rain, preliminary Meteorological Aviation Report (METAR) and ASOS Controller Equipment (ACE) enhancements.
EQUIPMENT AFFECTED	:	ASOS Acquisition Control Unit (AACU)
PARTS REQUIRED	:	CPU Microcircuit P/N 62828-45000 CPU Microcircuit P/N 62828-45001 ACU Memory Microcircuit P/N 62828-45002 ACU Memory Microcircuit P/N 62828-45003 ACU Memory Microcircuit P/N 62828-45004 ACU Memory Microcircuit P/N 62828-45005 RAM Chips P/N 62828-90036-1 (4 ea.) Label, ACU Memory Card Stuffing Chart Label, ACU
MOD PROCUREMENT:		The above parts are available through NLSC and are only available for each site listed in Appendix E. Technicians should order one set of CPU EPROMS, S100-1A2A1-U29 for each ACU CPU when upgrading to 1.81 (two sets per system). Order one set of ACU memory EPROMS, S100-1A2A3-U8A, and S100-FMK059 which includes four RAM chips, S100-1A2A3U24 and two labels, one memory board label and one ACU stuffing chart label. Return old EPROMS to NRC.
SPECIAL TOOLS REQUIRED	:	IC insertion tool Small flat blade screwdriver Conductive foam Electrostatic discharge (ESD) straps
TIME REQUIRED	:	1 hour
EFFECT ON OTHER INSTRUCTIONS	:	EHB-11, section 3.6, Modification Note 32 must be installed in conjunction with this modification. This modification note supersedes Modification Note 20, including errata, and Mod 14. Remove Modification Note 29, if installed, before starting this modification.

AUTHORIZATION	:	This modification is authorized by ECPs E94SM05F112, E94SM05F120, and E95SM05F142
VERIFICATION STATEMENT	:	This modification has been tested for operational integrity at the sites listed in Appendix B and the Engineering Design Branch laboratory.

GENERAL

This modification note provides procedures to upgrade the ASOS software by removing and replacing erasable programmable read only memory (EPROM) and adding random access memory (RAM). This note provides procedures for "Before Installing Firmware" and "After Installing Firmware." Appendix C contains information on changes and corrections implemented in firmware version 2.3. Before installing Modification Note 31, reference EHB-11, section 3.6, ASOS Modification Notes 32. The voice processor firmware, Modification Note 32, is required to be installed in conjunction with this modification.

PROCEDURE

The following installation instructions are for EPROMs U8, U7, U17, and U21, RAM chips U46, U47, U52, U53 on the ACU memory board 1A2A3. Installation instructions are also for EPROMs U29 and U30 on the ACU CPU boards 1A2A1 and 1A2A2 when upgrading to version 1.81. The instructions also include placement information for the ACU stuffing chart label and the ACU memory board part number label.

CAUTION

Be careful to protect the electronics on the ACU memory and CPU boards during this procedure. Do not reconfigure any jumpers on the ACU memory or the ACU CPU boards unless instructed to do so by the procedure.

BEFORE INSTALLING FIRMWARE

1. Call the AOMC at 1-800-242-8194 and provide notification on which ASOS you will be installing new firmware. Confirm that the AOMC will provide access to the site-specific data base. Coordinate with the AOMC so the data base is available. Upload the current configuration before installing the new firmware.

2. Get approval of the responsible MIC/OIC before starting installation. You may install on any day of the month if restrictions in steps 3 and 4 are satisfied.

3. **Commissioned Sites Only**: Do not start installation during bad weather, precipitation, instrument flight rule (IFR) conditions, or if any of these conditions are expected within 3 hours. The responsible MIC/OIC will define these meteorological conditions.

4. Do not start firmware installation at a time that will conflict with scheduled synoptic observations at 00, 03, 06, 09, 12, 15, 18, and 21Z. Although about 45 minutes should be sufficient, allow one hour to complete installation and restart ASOS.

5. Immediately before beginning work at NWS staffed sites, the MIC/OIC/Observer will inform the tower and any other critical users that ASOS will be shut off for firmware upgrade. At an unstaffed site, the el tech will inform the tower using Controller Video Displays (CVD) and Operator Interface Devices (OID) to log off and shut down display power to avoid confusion. Commissioned sites only, are to download the following data to the laptop using the direct command mode: 5-minute data (12 hrs.), SYSLOG information (24 hrs.), SHEF messages (24 hrs.), and any 2-hour archive files.

6. Do not begin the installation process, i.e., halt ASOS, until immediately after an hourly observation has been transmitted. At NWS-staffed sites, normal backup observing procedures will be implemented.

7. Disable all hardwire and dial communication ports to AFOS (REVUE-SITE-CONFG-COMMS). Go into the AOMC page (REVUE-SITE-VERSN-AOMC); wait for the external communication and the site physical lines to change from "AUTO UPLOAD REQ" to "COMPLETE" before going to the next step. The system voice function will automatically broadcast a "not available" message when the ACU power is turned off.

8. Make the appropriate SYSLOG entries (MAINT-ACT-FMK) Mod 31:
   1. Log on as **TECH**.
   2. Key the **MAINT** screen.
   3. Key the **ACT** page.
   4. Key **START** - Stop here and preform Mod 31.
      Upon completion of the Mod 31, log onto the system.

9. Continue with Appendix A, Instructions for ASOS Software Version Upgrade. Once the steps in Appendix A have been completed, continue with "After Installing Firmware," step 10.

AFTER INSTALLING FIRMWARE

See page 4 for a description of the time required to reboot ASOS and sensor response time after a new firmware load.

10. When ASOS is restarted at unstaffed sites, call to inform towers using CVDs and OIDs to turn on their displays. (At staffed sites, the MIC/OIC/Observer will call the tower.)

11. If on-site NWS staff provides backup while the installation is underway, no special observation is needed when ASOS is restarted. Proceed to step 12.

If there is no backup at a site and a record observation was missed during the installation, a special observation must be taken when ASOS is restarted. The el tech should take the following steps at the ASOS keyboard after installation:

1. Press [SIGN].
2. Type his/her initials and press [RETURN].
3. Type the observer level password and press [RETURN].
4. Press [GENOB].
5. Press [SPECL].
6. Press [EXIT].
7. Press [SIGN].
8. Type his/her initials again and press [RETURN].
9. Press [RETURN] twice. This signs the "observer" off ASOS.
10. Leave ASOS running.

Note: The "observer" must sign off before the 5-minute edit time is up.

12. Inform the office staff that ASOS is again operational. If less than 25 minutes remain until the next hourly observation, augmentation of the ceiling may be required. It may be necessary to augment several elements or even the entire observation. The chart below indicates how long it takes after a start up for ASOS to report each observation element automatically.

Times Needed for Elements to be Reported Automatically

	Minimum	Maximum
Pressure	60 seconds	10 minutes
Precipitation Amount	60 seconds	*
Wind direction	2 minutes	7 minutes
Wind speed	2 minutes	7 minutes
Precipitation Type	2 minutes	*
Temperature	5 minutes	10 minutes
Dew Point	5 minutes	10 minutes
Visibility	10 minutes	15 minutes
Obstruction to Visibility	10 minutes	*
Ceiling	30 minutes	35 minutes

* Maximum time not applicable since phenomena may not be present. Minimum time applies if phenomena are present.

13. Verify that ASOS transmitted an hourly observation. Call the AOMC at 1-800-242-8194 and tell the operator:
    1. Your location;
    2. That installation of the new firmware has been completed;
    3. That ASOS is operational.

14. Enter in the SYSLOG that maintenance has been completed.
    1. Key the **MAINT** screen.
    2. Key the **ACT** page.
    3. Key **FMK** - Enter the Field Mod Kit (FMK) number as follows: **Mod 31**.
       On the second line of the screen verify that only **Mod 31** is displayed. Complete by entering **Y** in the Y/N if only **Mod 31** is displayed. If mods 31 and 32 were completed, make appropriate log entries.
    4. Check the **SYSLOG** and verify the **FMK** message. **Enter a comment in the SYSLOG stating that version 2.3 has been installed. Notify the AOMC via telephone that Mod 31, version 2.3 and any other Mods have been completed.**

15. At an expansion site with ATCT, the el tech will contact the ATCT and supply information on the following:

    1. ASOS maintenance is completed.
    2. ASOS is restored to service.
    3. Tower CVDs and OIDs need to be turned on, and TRACON displays need to be turned on.

Reporting Modification

Target date for completion of this modification is 30 days after receipt of parts. Report completed modification on a Weather Service Form A-26 maintenance record, per instructions in EHB-4, Part 2, Appendix F, using reporting code AACU. **Add in the comment field that version 2.3 was installed.** If this modification is installed in conjunction with Modification Note 32, a separate Weather Service Form A-26 must be completed for each modification note.

Also, record the modification number in block 17(A) as 31 (see Appendix D for a completed sample of WS Form A-26).

NOTE:
Parts removed (EPROMs) should be properly packed and returned to NRC as S100-FMK015D.OLD. NRC will be reprogramming the EPROMs for other ASOS applications.

Acting Chief, Engineering Division

Appendix A
Appendix B
Appendix C
Appendix D
Appendix E

W/OSO321:AJWissman:rhz:2/1/96:rev.2/5/96:sol:"MOD31.h11" on disk EHB11-H

INSTRUCTIONS

FIELD MODIFICATION KIT - ASOS SOFTWARE VERSION UPGRADE

1. UPGRADING ASOS SOFTWARE

1.1 GENERAL

All ASOS application software is contained on the four erasable programmable read only memory (EPROM) integrated circuits (IC) on ACU memory board 1A2A3. Figure 1 illustrates the ACU memory board and identifies the four EPROMs (U8, U17, U7, and U21). The EPROMs are 32-pin dual in-line package (DIP) CMOS devices, each providing 512K x 8 bits of storage. Upgrading ASOS software requires only replacing the four EPROMs on the ACU memory board with higher revision level ICs.

Figure 1 also identifies the four additional RAM chips (U46, U47, U52 and U53). The RAM chips are 32-pin DIP CMOS devices, each providing 128K x 8 bits of storage. There will be no jumpers or switch setting changes to the board. One RAM chip is added to the top of the clock socket/chip (U52). This causes the chip to protrude into the next card slot position.

All ASOS operating software is contained on two EPROM ICs on each ACU CPU board lA2Al and lA2A2. Figure 2 illustrates the ACU CPU board and identifies the two EPROMs (U29 and U30). The EPROMs are 28-pin DIP CMOS devices, each providing 256K x 8 bits of storage. Upgrading pSOS ASOS software requires only replacing the two EPROMs on each ACU CPU board with higher revision level ICs.

The four EPROMs on the ACU memory board contain both the ACU application program and the DCP application program. The ACU CPU runs the ACU application program directly from the ACU memory board. The DCP application program must first be downloaded from the ACU memory board to RAM storage in the DCP before it can be run by the DCP CPU.

Sites without a local OID (i.e., no RS232 connected for the primary OID) should attach a terminal to the primary OID port of the ACU 1A9J22 before proceeding.

1.2 SOFTWARE UPGRADE PROCEDURE

This procedure provides instructions to upgrade ASOS software by removing and replacing the four EPROMs and adding four RAM chips on the ACU memory board. This procedure also provides instructions to upgrade two EPROMS on each of the ACU CPU boards to version 1.81. After new EPROMs are installed, this procedure cold starts both the ACU and associated DCPs.

If the ACU EPROMs in the system are 1.70 or higher, the ACU is no longer cold started by removing battery jumper J22 (Figure 1) to clear all RAM on the board. The next step requires receiving a download of site-specific data from the AOMC. The DCPs are cold started by performing a hard reset of each DCP from the processor status page on the OID. After

completion of the upgrade procedure, the EPROMs removed from the ACU memory board should be packaged in appropriate electrostatic discharge (ESD) protective material for return to NRC.

NOTE:
There may be an approximate 20-minute wait required to access the AOMC.

Step

1. If the printer is on-line, place it off-line by pressing the **ON-LINE** switch located on the printer front panel.

CAUTION

Damage to equipment may result if power is not removed prior to removal or installation. Ensure that OUTPUT POWER switch is set to 0 (**OFF**) and facility power is removed.

To avoid damage to circuit boards and integrated circuits, use proper ESD handling procedures, including using a grounding strap when performing the following steps.

2. Set OUTPUT POWER switch on UPS status panel to 0 (**OFF**) position. The indicator for the OUTPUT status panel extinguishes. (This step is only required on systems with a UPS).

3. Remove facility AC power from ACU cabinet.

4. Using a small flat blade screwdriver, loosen the captive screws located at top and bottom of ACU memory board 1A2A3. Loosen captive screws located at top and bottom of the ACU CPU boards 1A2A1 and 1A2A2 if ACU CPU firmware has not been upgraded to version 1.81.

5. Press extractor handles at top and bottom of ACU CPU boards 1A2A1, 1A2A2 if required and ACU memory board 1A2A3 in opposite directions to release board. Remove board from rack.

6. On the underside of the ACU memory board, using a flat blade screwdriver, remove three screws and flat washers securing front panel to board. Remove board from front panel.

7. If the ACU EPROMS in the system are 1.70 or higher proceed to step 8, otherwise continue with step 7. Remove battery jumper J22 from ACU memory card. The jumper will be reinstalled during the installation procedure.

CAUTION

Throughout this procedure, discharge the screwdriver before and during use by touching tool to the grounded chassis surface. Failure to comply may result in damage to the integrated circuits.

8. From the front of the board, slide small flat blade screwdriver between integrated circuit U7 and its IC socket. Carefully lift up on U7 to remove it from the socket as evenly as possible. After U7 is removed from the socket, place in a conductive foam or on some other static-free surface.

9. Repeat Step 8 for removal of the following integrated circuits U8, U17 and U21.

10. If required, remove U29 and U30 from the ACU CPU printed circuit boards 1A2A1 and 1A2A2 sockets and place the removed integrated circuits in a conductive foam or on some other static-free surface.

CAUTION

The ACU memory board has a battery that keeps voltage on the RAM sockets. **DO NOT** use a metal insertion tool when installing the RAM ICs. Avoid shorting out the voltage and ground pins. Shorting out the voltage pin will corrupt any stored data and is similar to performing a cold boot.

11. Using the IC insertion tool, remove the new EPROM ICs from protective packaging and insert them into the ACU memory board sockets in accordance with the following chart. Ensure that the EPROMs are installed with pin 1 (as identified by notch in top of IC) oriented toward board connector P1 and P2 as shown on Figure 1.

IC socket	IC part number
U8	62828-45002-1
U17	62828-45003-1
U7	62828-45004-1
U21	62828-45005-1

12. Using the IC insertion tool, remove the RAM ICs from protective packaging and insert them into the ACU memory board sockets U46, U47, U52 and U53. Ensure that the RAMs are installed with pin 1 (as identified by notch in top of IC) oriented toward board connector P1 and P2 as shown on Figure 1. U52 already has a clock chip installed. **DO NOT REMOVE THE CLOCK CHIP.** Install the RAM chip on top of the clock chip.

13. Remove the part number label (ASSY 62828-47008-10) from the ACU memory card and install the new label (ASSY 62828-47008-20) in the same location.

14. Use a small flat blade screwdriver, and install the three flat washers and screws. This will secure the front panel to the board.

15. With the RAM chip stacked on top of the clock chip, the RAM chip protrudes into the next card slot. Remove the board or blank panel in VME slot 1A2A4.

16. Hold the ACU memory board by handles, position the board with the component side facing to the right and carefully slide board into VME slot 1A2A3. Align the board with the rear connector and press into place. Reinstall the 1A2A4 board or blank panel.

17. Use a small flat blade screwdriver and tighten the captive screws located at top and bottom of boards and blank panels.

18. If required, remove the new EPROM ICs from the protective packaging. Use an IC insertion tool to insert the EPROMs into the ACU CPU board's sockets (1A2A1 and 1A2A2) in accordance with the following chart. Ensure that all the EPROMs are installed with pin 1 (as identified by notch in top of IC) oriented toward the top of the ACU CPU board as shown on Figure 2.

IC socket	IC part number
U29	62828-45000-1
U30	62828-45001-1

19. If required, hold the ACU CPU board by the handles, position the board with the component side facing to the right and carefully slide board into the card rack on its guides. Align the board with the rear connector and press into place.

20. If required, use a small flat blade screwdriver, and tighten the captive screws located at the top and bottom of the ACU CPU board.

21. Install the stuffing chart label directly over the stuffing chart located on the inside of ACU back door. Center the stuffing chart label over the ACU memory board section of the chart.

22. This completes Modification Note 31. Complete Modification Note 32 before going to step 22.

23. Apply facility power to ACU cabinet. Set OUTPUT POWER switch to 1 **(ON**) position. (This step is not required for systems that do not have a UPS).

24. After the power is applied to the ACU, one of the PASS (Green) LEDs on the CPU should illuminate and the PASS LED on the other CPU will remain off. After approximately 1 minute, the LED that was off should start blinking.

25. Place the line printer on-line by pressing the **ON-LINE** switch located on the printer front panel. **ON-LINE** indicator illuminates.

26. With the power applied to the ACU and OID and after a brief warmup delay, the OID displays 1-minute data. If the display is not being updated, press the HELP key twice to refresh screen. The NEED SID AND AOMC PHONE message appears at top of screen. If this does not occur, return to REMOVAL procedure, step 1. Follow the steps until the ACU memory board is removed. Ensure the ACU EPROMs are installed correctly. Follow the INSTALLATION procedures to replace the ACU memory board.

27. At the OID, sign onto system as a "Technician."

28. Display the external communications page on the OID (sequentially press REVUE-SITE-CONFG-EXTRN keys from 1-minute display). Enter both AOMC phone numbers (1-800-253-4717 & 1-800-434-1133) into the AOMC PHONE NUMBER field and press the EXIT function key.

29. Display the site physical page on the OID (sequentially press REVUE-SITE-PHYS function keys from 1-minute display). Enter the three or four character SID code in the STATION IDENTIFIER field and press the EXIT function key. The system then calls the AOMC and receives a download of site-specific data.

30. Display the AOMC version page on the OID (sequentially press REVUE-SITE-VERSN-AOMC function keys from 1-minute display). This will allow you to observe that all the files are being downloaded from the AOMC. All status fields should read "COMPLETE" in approximately 5 minutes. Press EXIT.

NOTE: The following steps cold start the DCPs.

31. Display the maintenance page on the OID (press the MAINT function key from 1-minute display).

32. Use the PREV/NEXT keys, position the cursor over PROC field and press the SEL key. The OID displays the processor status page.

33. Use the PREV/NEXT keys, position the cursor over DCP #1 - HARD field and press the RESET key. Respond "YES" and "ENTER" to the "ARE YOU SURE?" message. The corresponding status field displays INITIALIZING while the unit is initializing. The progress of the download can be monitored by the PERCENT COMPLETE message that appears at the top of the screen. When the percent complete reaches 100, the DCP status field changes to RUNNING.

34. If the system contains more than one DCP, repeat step 31 for DCPs #2 and #3 as required.

FINAL ACTIONS

1. After the Mod has been completed, clear any maintenance flags that occur as a result of the restart.

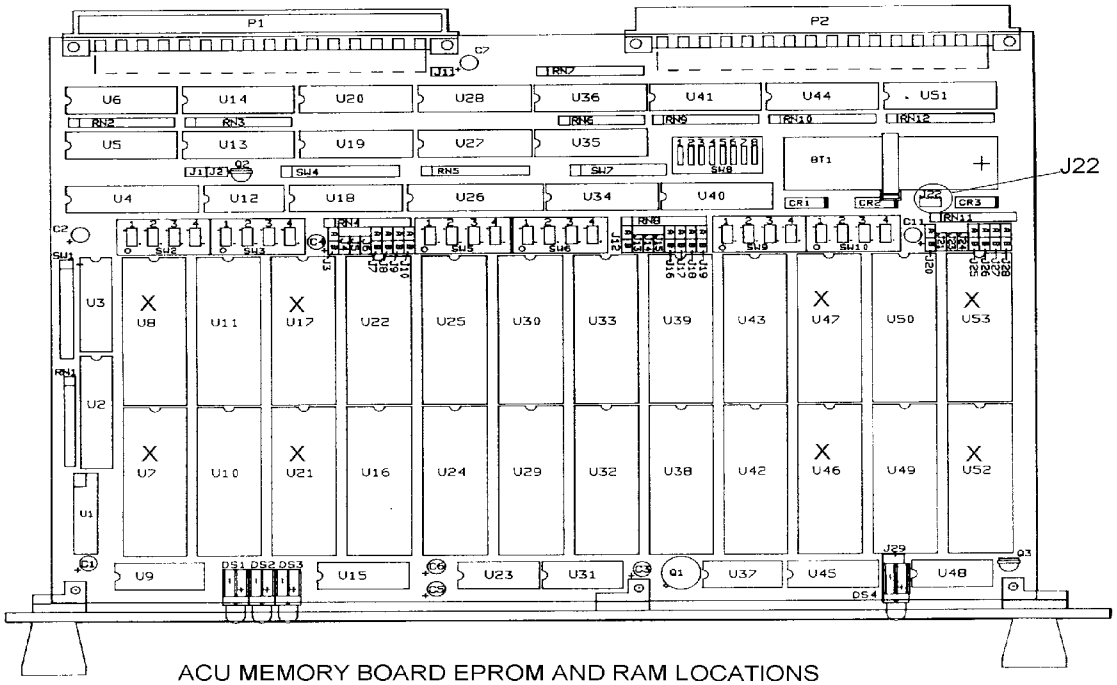
2. Display the SW version page on the OID (sequentially press REVUE-SITE-VERSN-SW function keys from 1-minute display). The following fields should display version 2.3: MEMORY ACU APPLICATION EPROM, MEMORY DCP APPLICATION EPROM, and MEMORY DCP APPLICATION RAM. PSOS field should display “CPU A PSOS OS EPROM 1.81" and “CPU B pSOS OS EPROM 1.81." (These fields may take 5-10 minutes before they all read 2.3.)

3. When upgrading from ACU firmware 2.2 or later this step is not required. Technicians should enter site identifications for each AFOS dial backup telephone number. SHEF addresses must be entered on the external communications page. Specific addresses can be obtained from the local MIC/OIC. AFOS backup block and the AOMC 1200 baud fields should be **N**, for all sites in the CONUS.

4. ***With the installation of firmware 2.3, the freezing rain sensor must be configured in accordance with the ASOS site technical manual S100, chapter 1, paragraph 1.3.10.3, table 1.3.2.1.***

5. Sites with GTA radios should be configured in accordance with the ASOS site technical manual S100, chapter 12, paragraph 12.3.5.1.

ASSEMBLY DRAWING



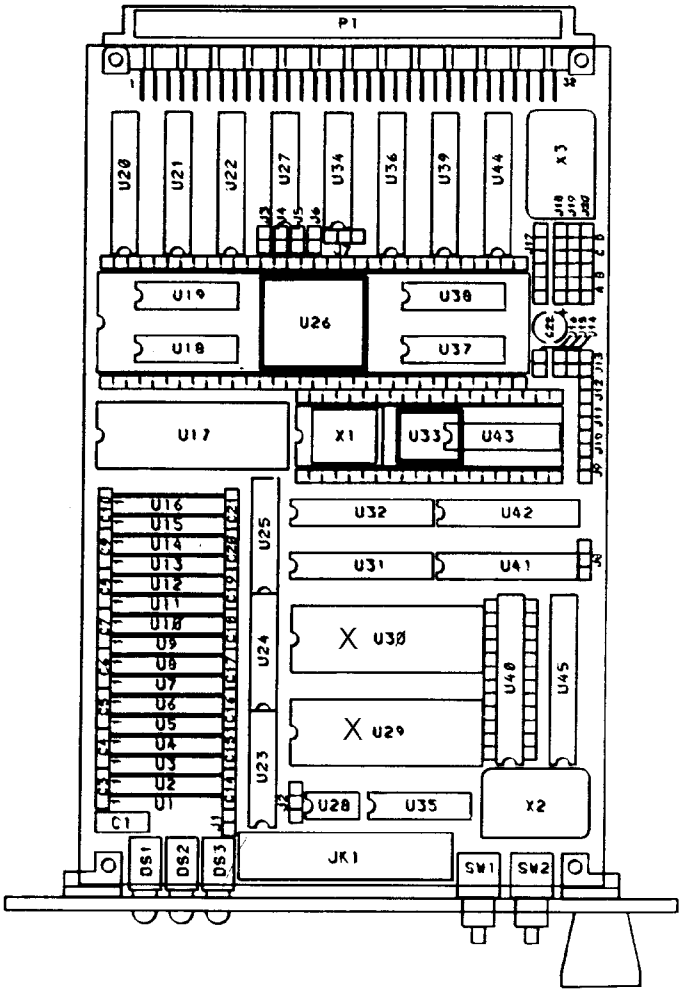
ACU MEMORY BOARD EPROM AND RAM LOCATIONS

FIGURE 1

EPROM
U7
U8
U17
U21

RAM
U46
U47
U52
U53

ASSEMBLY DRAWING



CPU BOARD

EPROM
U29
U30

FIGURE 2

The test sites for version 2.25 are:

NWS Southern Region

AHN - Athens, GA
3R5 - New Braunfels, TX
ABQ - Albuquerque, NM
MIA - Miami, FL

NWS Central Region

FAR - Fargo, ND

NWS Western Region

SLC - Salt Lake City, UT

NWS Alaska Region

ANC - Anchorage, AK

Operational Trouble Reports (OTR) Fixed in V2.3

This appendix is a subsection of the Software release note published by the Field Systems Branch, OSO13. The software release note describing the detail changes to ASOS software version 2.3 is available from Frank Lucadamo, 301-713-0386 ext. 186,and should be read by all technicians. Electronic distributions are also available.

If it becomes necessary, the electronics technician can edit the default METAR implementation date of June 1, 1996. Other changes which affect the electronics technician are described below.

ITEM	TITLE/COMMENTS	PROBLEM	SOLUTION
1	Missing SYSLOG entry for editing of altimeter setting.	When the observer edits the altimeter field, an entry is not made in the SYSLOG to inform the technician that report processing was turned off.	When the observer EDITS the altimeter field, the message noting that report processing for the pressure sensors was turned off is now displayed in the SYSLOG.
2	Null field for AOMC phone number causes problems.	If no phone number (i.e., blank field) was entered in the AOMC primary phone number field on the REVUE SITE CONFIG EXTRN page, and the system was warm booted or the system configuration was changed, ASOS would report invalid data without any maintenance flag ($).	A blank field for AOMC phone number entered on REVUE SITE CONFIG EXTRN page will not cause invalid data to be reported by ASOS. NOTE: Even though this is true, the AOMC primary and secondary phone numbers should be entered in these fields.
3	Visibility sensor diagnostics running check.	The visibility sensor hardware was modified to include improved sensor heater diagnostics.	ASOS will check the visibility code for heater diagnostics. If the temperature falls below 25NF and the heater is not turned on, the diagnostics will turn the heater on.
4	Invalid phone SYSLOG message.	Message "Phone #xxx Successful" was logged even though the reply option was set to NO.	Code was modified so the message "Phone #xxx Successful" appears only when the reply status is YES.
5	$ is incorrectly displayed in SAO when ASOS is using battery input power.	When the ACU or DCP goes to battery input power, a $ was appended to the SAO. This should not occur. This problem occurred only with the Deltec UPS.	The code was corrected so a $ is not displayed when the ACU or DCP is on battery backup power.

ITEM	TITLE/COMMENTS	PROBLEM	SOLUTION
6	Single cabinet ACU modifications.	Some ASOS sites do not have DCPs due to space problems. The ACU could handle only three local sensors.	Added 10 additional local sensors, added single-cabinet detect mode, and change power maintenance pages to handle normal ACU operation and single-cabinet mode operation.

This appendix summarizes the modifications made when ASOS version 2.0 was upgraded to 2.2. These changes are still valid in version 2.3. Sites upgraded from 2.0 to 2.3 must read this material.

The following abbreviations are used below to signify the user/system area who is impacted by the software change:

ALG - algorithm change; ATC - air traffic controller;
OBS - observer; SYS - system manager;
SYSCH - system change; TEC - electronics technician;
UNS - unsigned user;

User TITLE/Summary

ALG **Missing Wind Data Flags on Daily Summary** - Wind data continued to be updated on the daily summary page after report processing was turned off. The daily summary now reports "E" for estimated wind data.

ALG **Incorrect Present Weather Remark** - The system generated lengthy remarks during intermittent LEDWI operation (e.g., SEMMB17SEMMB22SEMMB36SEMMB36SEMM PWINO). ASOS now simplifies the remark to SEMM PWINO.

ALG **Rain Gauge Processing Deficiency** - ASOS continued to update precipitation parameters (24-hour precipitation and daily summary) after report processing was turned off for the tipping bucket. ASOS now ignores these tips.

ALG **Incorrect Daily Weather Code on Daily Summary** - The code "X" for tornado was entered on the daily summary even though the USP for tornado was aborted. The USP must now be transmitted before the code is updated on the daily summary.

ALG **Missing "E" Prefix for Edited Wind 5-MIN OBS** - The "E" prefix from 5-MIN OBS wind report was missing after an observer edit. "E" now correctly shows up in 5-MIN OBS.

ALG **Invalid Pressure Remark in SAO when Pressure Missing** - After pressure sensors showed "M," a PRESFR remark was still generated. The logic has been corrected.

ALG **Multiple Sensor Algorithms** - Meteorological discontinuity and backup algorithms replaced the early warning and areal algorithms.

ALG **Synoptic Maximum/Minimum Temperatures and 4 Group** - The calculation of the daily maximum and minimum temperatures has been simplified. A 4 group for 24-hour calendar day maximum and minimum temperatures has also been added to the SAO remarks.

IMPORTANT

Assuming an hourly report transmit time of HH:55 the following is true: The 1 and 2 groups, which give 6 hourly maximum and minimum temperatures (00, 06, 12, 18 UTC), and the 4 group, taken at 23:55 LST, all have a minor problem. Since these groups (1, 2, 4) of additive data are taken up to 55 minutes after the hour at the time of observation, and the temperature in the SAO/METAR observation are taken up to 56 minutes after the hour, a problem sometimes occurs. If the maximum temperature is found at 56 minutes after the hour, the observed temperature will indicate that temperature. The maximum temperature group will indicate the greatest temperature up to minute 55, which will be lower.

ALG **Tower Visibility Remark** - No tower visibility remark is included in the SAO when both tower and surface visibility are the same.

OBS **Invalid Temp Data Format on Monthly Summary** - Observers were able to enter only integer values for the temperature departure from normal on the monthly summary page. Observers can now enter data to the nearest tenth of a degree.

OBS **Expand Present Weather Field for Volcanic Ash** - The first line of the present weather field has been increased to 15 characters to allow entry of "VOLCANIC ASH."

OBS **Daily Summary Access/Edit** - The observer can now edit daily/monthly summaries even when a technician or system manager is signed on.

OBS **Variable Visibility Remarks** - The observer was unable to delete automated variable visibility remarks from the SAO, even though these remarks could be deleted from the EDIT-REM screen. In addition, there were inconsistencies between automated visibility remarks on the OID and in the voiced remarks. Both of these problems have been fixed.

SYS **SHEF Addresses** - Separate AFOS addresses have been added for the 15-minute criteria and 1-hour routine SHEF messages.

SYSCH **Required CRs and LFs Not in SAO Text** - WMO specifies that an SAO text line cannot exceed 69 characters with a double carriage return/line feed. ASOS now conforms with the WMO specification.

SYSCH **AOMC Display Page - Inaccurate Data/Time in the Download Column** - The time was inaccurate on the REVUE-SITE-VERSN-AOMC page after a download from AOMC. ASOS now downloads the SITE-PHYSICAL page first from AOMC. This corrects inaccurate data.

SYSCH **Improper Removal of TNO Remark** - The TNO remark was being removed whenever communication was established with GS-200 or ADAS. The TNO continues to appear when ADAS or GS-200 communication is established.

SYSCH **Rework Voicing of TNO, ZRNO, PWINO** - New voicing is:

TNO - "Thunderstorm information not available"
ZRNO - "Freezing rain information not available"
PWINO - "Present weather information not available"

SYSCH **SHEF Formatting** - The onset/termination criteria have been added to the 15-min SHEF message.

SYSCH **SHEF Formatting** - Missing data will be formatted with "M" rather than "MMM," which was used in previous ASOS versions.

SYSCH **SHEF Backup Dial Around** -
If AFOS Hardwire port is primary - If a valid response to the reply request is not received, a single additional attempt is made via AFOS phone.

If AFOS Phone is primary - Retry attempts are identical to those for SAOs.

ASOSs with a hardwire connection to AFOS will now be able to transmit SHEF messages on the dial backup port without ACK/NAK protocol.

SYSCH **Queued SHEF Messages** - If there are two SHEF messages of the same type in the ASOS-to-AFOS message queue, the most recent message is transmitted and the older message is archived with a FIBI.

SYSCH **Major Rework of Voice Broadcast** - There is now greater use of phrases rather than single words. Vocabulary has been increased.

SYSCH **AFOS Port Sharing Device (PSD)** - A PSD at ASOS sites can be used to communicate with AFOS using a Remote Terminal to AFOS (RTA) and Auxiliary Backup Terminal (ABT).

SYSCH **UPS Replacement** - The SOLA UPS is no longer in production and is being replaced by a DELTEC UPS.

SYSCH **Part-Time Station Observer Logoff** - ASOS was logging observers off during their shift at part-time stations. Additional checks were included to address opening/closing times for part-time stations.

SYSCH **HDLC Communications Protocol Anomaly/Errors** - The HDLC protocol software used for ADAS/GS-200 communications had minor problems in error recovery logic. The logic has been corrected.

TEC **Spontaneous Warm Boots** - SMI has written software to flag all VME BUS errors in the code, so that they can pinpoint where warm boots are occurring. The VME BUS error will tell the SMI programmers the last line of code that was executed before the warm boot occurred. SMI hopes that this will help isolate the problem. **This is not intended to solve the warm boot problem (these OTRs are still considered open); it is intended to acquire information to help them solve the problem.**

TEC **Pressure Sensor Status Deficiency** - The ACU Status screen reported Pressure "*" (indeterminant) while REVUE-SENSOR-STATUS reported "P" (pass). Both screens now report "*."

TEC **20% Comms Fails Not Reported On 2nd Day** - When sites experienced ACU/DCP Comms Fails >20% of the time for 2 days. The SYSLOG reported failures only on the first day. SYSLOG now reports COMMS failures at 0600 LST each day.

TEC **AOMC Secondary Phone Number** - This adds a secondary phone number for AOMC on the REVUE-SITE-COMMS-EXTRL page, so ASOS sites have more than one phone number to dial AOMC for software uploads/downloads.

TEC **External Communications Page** - AFOS site IDs are now displayed with the AFOS dial backup phone numbers.

TEC **Remote Pressure Sensor Capability** - Pressure sensors can now be configured at the DCP.

TEC **Dial Backup for Alaska and Hawaii** - Backup is provided via AFOS phone (port 1) for dial backup to the PRIME computer when the link between ASOS and ADAS/GS-200 has been lost (if there have been no ADAS/GS-200 communications for six minutes).

TEC **Addition of Digits for ASOS-to-AOMC Phone Numbers** - Additional digits have been added to accommodate auxiliary telephone systems at remote ASOS sites.

TEC **1200-Baud Flag for Alaska-AOMC Comms** - An editable flag is provided within the AOMC phone numbers to set the AOMC phone link to 1200 baud when Alaska sites dial AOMC.

TEC **GTA Radios** - The maintenance screen now displays: transmit frequency, power level, power supply status, forward and reflected voltages, and ACU communications. The frequency and power level can be set from the OID (by the electronics technician or system manager).

Sample of A-26

SITES REQUIRING VERSION 2.3

This firmware is reserved for National Weather Service sites ONLY. FAA expansion sites will continue to use firmware version 2.2. The following sites are commissioned NWS sites that require the installation of firmware version 2.3. Sites soon to be commissioned also require version 2.3. OKC does not get version 2.3.

Eastern Region

ILG	WILMINGTON	DE	CAK	AKRON	OH
			CLE	CLEVELAND	OH
ORH	WORCESTER	MA	DAY	DAYTON	OH
			MFD	MANSFIELD	OH
PWM	PORTLAND	ME	TOL	TOLEDO	OH
			YNG	YOUNGSTOWN	OH
GSO	GREENSBORO	NC			
HSE	HATTERAS	NC	ABE	ALLENTOWN	PA
ILM	WILMINGTON	NC	ERI	ERIE	PA
RDU	RALEIGH/DURHAM	NC	IPT	WILLIAMSPORT	PA
			PHL	PHILADELPHIA	PA
ACY	ATLANTIC CITY	NJ			
			PVD	PROVIDENCE	RI
ALB	ALBANY	NY			
BGM	BINGHAMTON	NY	CAE	COLUMBIA	SC
BUF	BUFFALO	NY	CHS	CHARLESTON	SC
NYC	CENTRAL PARK	NY			
SYR	SYRACUSE	NY	RIC	RICHMOND	VA
			BTV	BURLINGTON	VT
			BKW	BECKLEY	WV
			CRW	CHARLESTON	WV

Southern Region

HSV	HUNTSVILLE	AL			
MGM	MONTGOMERY	AL	PBI	WEST PALM BEACH	FL
MOB	MOBILE	AL	TPA	TAMPA	FL
FSM	FORT SMITH	AR	AHN	ATHENS	GA
			ATL	ATLANTA	GA
DAB	DAYTONA BEACH	FL	CSG	COLUMBUS	GA

AGS	AUGUSTA	GA
MCN	MACON	GA
BTR	BATON ROUGE	LA
LCH	LAKE CHARLES	LA
SHV	SHREVEPORT	LA
JAN	JACKSON	MS
MEI	MERIDIAN	MS
TUP	TUPELO	MS
TUL	TULSA	OK
CHA	CHATTANOOGA	TN
TRI	BRISTOL	TN
TYS	KNOXVILLE	TN
ACT	WACO	TX
AMA	AMARILLO	TX
AUS	AUSTIN	TX
BPT	BEAUMONT	TX
BRO	BROWNSVILLE	TX
CRP	CORPUS CHRISTI	TX
DFW	DALLAS / FT WORTH	TX
ELP	EL PASO	TX
LBB	LUBBOCK	TX
SAT	SAN ANTONIO	TX
SJT	SAN ANGELO	TX
SPS	WICHITA FALLS	TX
VCT	VICTORIA	TX

Central Region

ALS	ALAMOSA	CO
COS	COLORADO SPRINGS	CO
DEN	DENVER	CO
LIC	LIMON	CO
PUB	PUEBLO	CO
MLI	MOLINE	IL
ORD	CHICAGO	IL
PIA	PEORIA	IL
RFD	ROCKFORD	IL
SPI	SPRINGFIELD	IL
EVV	EVANSVILLE	IN
IND	INDIANAPOLIS	IN
CNK	CONCORDIA	KS
DDC	DODGE CITY	KS
GLD	GOODLAND	KS
ICT	WICHITA	KS
TOP	TOPEKA	KS
CVG	COVINGTON	KY
JKL	JACKSON	KY
PAH	PADUCAH	KY
SDF	LOUISVILLE	KY
DBQ	DUBUQUE	IA
DSM	DES MOINES	IA
SUX	SIOUX CITY	IA
DTW	DETROIT	MI
FNT	FLINT	MI
GRR	GRAND RAPIDS	MI
STC	ST CLOUD	MN
COU	COLUMBIA	MO
MCI	KANSAS CITY	MO
SGF	SPRINGFIELD	MO
FAR	FARGO	ND
BFF	SCOTTSBLUFF	NE
GRI	GRAND ISLAND	NE
LBF	NORTH PLATTE	NE
LNK	LINCOLN	NE
VTN	VALENTINE	NE
ABR	ABERDEEN	SD
RAP	RAPID CITY	SD
MKE	MILWAUKEE	WI

CYS	CHEYENNE	WY
RIW	RIVERTON	WY

Western Region

FLG	FLAGSTAFF	AZ
IGM	KINGMAN	AZ
INW	WINSLOW	AZ
PHX	PHOENIX	AZ
TUS	TUSCON	AZ
BIH	BISHOP	CA
BLU	EMIGRANT GAP	CA
FAT	FRESNO	CA
RBL	RED BLUFF	CA
BOI	BOISE	ID
LWS	LEWISTON	ID
BIL	BILLINGS	MT
FCA	KALISPELL	MT
GGW	GLASGOW	MT
GTF	GREAT FALLS	MT
HLN	HELENA	MT
HVR	HAVRE	MT
ELY	ELY	NV
LAS	LAS VEGAS	NV
RNO	RENO	NV
WMC	WINNEMUCA	NV
AST	ASTORIA	OR
BNO	BURNS	OR
EUG	EUGENE	OR
PDT	PENDLETON	OR
PDX	PORTLAND	OR
SLE	SALEM	OR
SXT	SEXTON SUMMIT	OR
GEG	SPOKANE	WA
OLM	OLYMPIA	WA
SMP	STAMPEDE PASS	WA